EARTHING (Conventional)

Total Earth Pits required: 4(including one test pit)

Earth Pit 1:

* Tower grid earthing for tower body
* Tower LA

Earth Pit 2:

* Solar
* ACDB
* SMPS/CCU
* Batery Bank

Earth Pit 3:

* EB neutral and DG earthing using GI pipe

Total GI plates in one earth pit needed = 4

From plate no.2 one GI strip is connected for Earthing tower body and another GI strip is connected for earthing LA

From plate no.1 one GI strip is connected to Power Room

4 GI strips are required for connecting 4 GI plates in the pit

Total GI strips required for one Earth Pit = 6

Dimension of GI plate = 400x600x6.5mm

Dimensions of each GI strip = 50x3 mm

Depth of Earth pit=3m

Dimensions of Earth pit= 2x2x3mm

Standard Earth Resistance= 0.5 Ohm

Earth Pit Dimension: 2x2x3m

Test Pit Dimension: 0.3x0.3x0.45m

Tower Dimension: 4.5x4.5x40m

**Solar Panel**

2 solar panels of 5kW each = 10kW (Total Power Of Solar panel)

Gap between legs of Solar panel = 1187 mm

**Dimensions**

1st 4 columns: 1464x2304 mm

2nd 4 columns: 1800x2304mm

3rd 4 columns: 1300x2304mm

Gap between fence and solar panel= 619 and 520 mm

Fencing dimensions: 12.5mx16m

Solar Foundation length=11.49m

**Earthing Process**

**Methods:**

* + **Plate type (using Cast Iron plate, Galvanised Iron plate, Copper Plate)**
  + **Pipe type (using GI pipe of 75mm, 10ft, 6 holes for connection of earth wires and inserted in ground)**

**Method For Construction of Earth Pit:**

* Excavation (2x2x3m)
* Placing GI plates (400x600x6.5mm) for more contact of earth and reduce earth resistance
* Fill the pits with mixture of wood coal powder salt and sand in equal part
* Wood coal powder good conductor of electricity, anti corrosive, longer plate life
* Coal and salt to keep soil wet permanently
* Use GI strip to connect GI plate to earthing system
* Cover the GI strip with GI pipe(2.5” diameter) with flange
* Cover top of GI pipe with T joint to avoid jamming of pipe with dust and water
* Use GI pipe to water the bottom of earth plates

**Factors affecting earth resistivity: (Standard Earth Resistance=0.5 ohm)**

* Soil resistivity (depends on soil variety)
* Moisture present in soil
* Dissolved salts (small quantity of dissolved salts can reduce resistivity upto 80%)
* No. of plates (Distance between electrodes must be equal to driven depth to avoid overlapping of resistance area of influence )
* Current magnitude(More Current ->More drying of soil->More resistance)

**Resistance of plate electrode to earth**

R=r/A \* sqrt(pi/A)

r=resistivity of soil

A=area of earthing plate

**Chemical Earthing**

* **Filler:** Advanced form of conventional earthing where silica associated back fill along with bentonite is used in place of charcoal and salt
* **Electrodes used:** Pure copper earthing electrodes, copper bonded earthing electrodes, GI earthing electrodes in place of pure copper earthing plates.
* **Life:** 12-15 years in comparison to conventional earthing 3-4 years
* Relatively cheaper in comparison to conventional earthing in terms of service life

**Method of Earthing(Hybrid):**

* 6 Earth Pits in total (1 Test Pit, 2 Chemical Earth Pit, 3 Conventional Earth Pit)
* Earth Pit 1: Tower Earthing
* Earth Pit 2: For LA
* Chemical Pit 1: Solar, SMPS/CCU, Battery Bank, ACDB
* Chemical Pit 2: BTS, Media Equipment
* Earth Pit 3: EB/DG neutral for GI pipe earthing

All the other details are same as the Conventional Earthing

EB Neutral EB meter/ACDB

EP3

SOL

DG

TOWER

SMPS/CCU

BATTERY

EP1

TEST

SOLAR PANEL

EP2